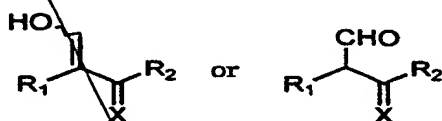


What is claimed is;

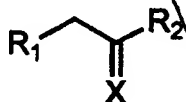
1. A process to produce compounds represented by a general formula (II);



General formula (II)

wherein R<sub>1</sub> represents hydrogen, halogeno, optionally substituted alkyl, optionally substituted alkoxy, a group having an alicyclic structure, a group represented by R<sub>3</sub>S(O)<sub>q</sub>, a group represented by R<sub>4</sub>R<sub>5</sub>N, a group represented by R<sub>6</sub>C(=O), nitrile, nitro, a group represented by R<sub>7</sub>C(=NR<sub>8</sub>), optionally substituted aryl, optionally substituted aryloxy, or optionally substituted aralkyl, R<sub>2</sub> represents optionally substituted alkyl, optionally substituted alkoxy, a group having an alicyclic structure, optionally substituted amino, optionally substituted aryl, optionally substituted heterocyclic group or optionally substituted aralkyl, R<sub>3</sub>, R<sub>4</sub> and R<sub>5</sub> each independently represents optionally substituted alkyl, optionally substituted aryl, optionally substituted heterocyclic group or optionally substituted aralkyl, R<sub>6</sub> and R<sub>7</sub> each independently represents optionally substituted alkyl, optionally substituted alkoxy, a group having an alicyclic structure, optionally substituted amino, optionally substituted aryl, optionally substituted heterocyclic group or optionally substituted aralkyl, R<sub>8</sub> represents optionally substituted alkyl, optionally substituted alkoxy, nitrile, nitro, optionally substituted aryl, optionally

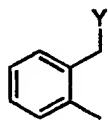
substituted heterocyclic group or optionally substituted aralkyl, q represents 0, 1 or 2, and R<sub>9</sub> and R<sub>10</sub> each independently represents hydrogen, lower alkyl or optionally substituted aryl, and R<sub>1</sub> and R<sub>2</sub> each represents a group which may bond to jointly form a ring, and X represents oxygen or a group represented by a formula of NR<sub>9</sub>R<sub>10</sub>, characterized in that the compound is subjected to a reaction with a methylene compound represented by a general formula (I);



General formula (I)

wherein R<sub>1</sub>, R<sub>2</sub> and X are as defined above, with either a formic acid ester or an orthoformic acid ester in the presence of a Lewis acid and a base.

2. The production process according to claim 1, wherein the base is a tertiary amine.
3. The production process according to claim 1, wherein the group represented by R<sub>1</sub> in the general formula (I) is a group represented by the following formula;

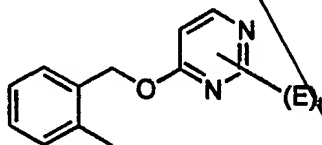


wherein Y represents a group to be eliminated when it is reacted with a nucleophilic reagent, optionally substituted phenoxy or optionally substituted heteroaryloxy, and the group represented

by  $R_2$  is a group represented by a formula of  $OR_{11}$ , wherein  $R_{11}$  represents lower alkyl.

4. The production process according to claim 1, wherein the compound represented by the general formula (I) is methyl 2-[(2-isopropoxy-6-trifluoromethylpyrimidine-4-yl)oxymethyl]phenylacetate.

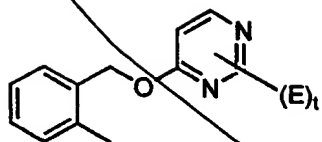
5. Compound represented the general formula (I), wherein the group represented by  $R_1$  is a group represented by the following formula;



wherein E represents  $C_{1-6}$  alkyl,  $C_{1-6}$  haloalkyl,  $C_{1-8}$  alkoxy,  $C_{1-6}$  haloalkoxy, optionally substituted amino, a group represented by a formula of  $R_{26}S(O)_p$ , wherein  $R_{26}$  represents alkyl or aryl and p represents 0, 1 or 2, optionally substituted aralkyl, optionally substituted aryloxy, optionally substituted heterocyclic group, optionally substituted heteroaryloxy, a group having an alicyclic structure, nitrile, nitro, alkoxycarbonyl, formyl or carboxyl, t represents 0, 1, 2 or 3, provided E each represents a same or different group when t is 2 or more integer.

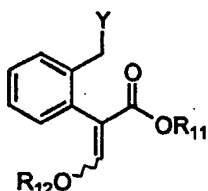
6. Compounds represented by the general formula (II), wherein the group represented by  $R_1$  is a group represented by the following formula;

Sub  
A2



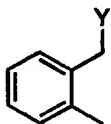
wherein E and t are as defined above.

7. A process for producing acrylic acid derivatives represented by a general formula (III);



general formula (III)

wherein Y and R<sub>11</sub> are as defined above, characterized in that the compound represented by the general formula (I), wherein R<sub>1</sub> represents a group represented by the following formula;

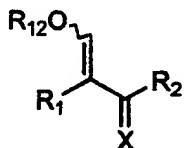


wherein Y is as defined above, R<sub>2</sub> is a group represented by a formula of OR<sub>11</sub>, wherein R<sub>11</sub> is as defined above, and X represents oxygen, is formylated by using either a formic acid ester or an orthoformic acid ester in the presence of a Lewis acid and a base and then converted to the alkoxymethylene form.

8. The process for producing acrylic acid derivatives according to claim 7, wherein the base is a tertiary amine.

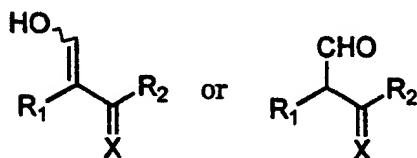
9. The process for producing acrylic acid derivatives according to claim 7, wherein the compound represented by the general formula (I) is methyl 2-[(2-isopropoxy-6-trifluoromethylpyrimidine-4-yl)oxymethyl]phenylacetate and the compound represented by the general formula (III) is 3-methoxy-2-[2-[(2-isopropoxy-6-trifluoromethylpyrimidine-4-yl)oxymethyl]phenyl]acrylic methyl.

10. A process for producing compounds represented by a general formula (IV);



General formula (IV)

wherein  $R_1$ ,  $R_2$  and  $R_{12}$  are as defined above, characterized in that the compounds are produced by reacting a formyl form represented by a general formula (II);

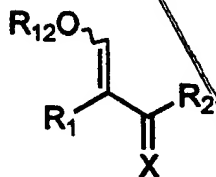


General formula (II)

wherein  $R_1$ ,  $R_2$  and  $X$  are as defined above, with an alcohol represented by a formula of  $R_{12}OH$ , wherein  $R_{12}$  is as defined

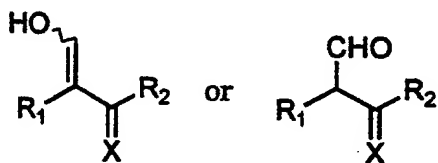
above, in the presence of an acid catalyst

11. A process for producing compounds represented by a general formula (IV);



general formula (IV)

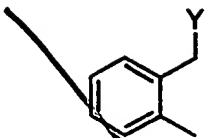
wherein  $R_1$ ,  $R_2$ ,  $R_{12}$  and  $X$  are as defined above, characterized in that a formyl form represented by a general formula (II);



General formula (II)

wherein  $R_1$ ,  $R_2$  and  $X$  are as defined above, is reacted with an alcohol represented by a formula of  $R_{12}OH$ , wherein  $R_{12}$  is as defined above, and an orthoformic acid ester represented by a formula of  $R_{13}C(OR_{12})_3$ , wherein  $R_{12}$  is as defined above and  $R_{13}$  represents hydrogen, lower alkyl, cycloalkyl, haloalkyl or aralkyl, in the presence of an acid catalyst.

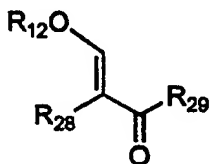
12. The production process according to claim 9 and claim 10, wherein the group represented by  $R_1$  in the compound represented by the general formula (II) is a group represented by the following formula;



wherein Y is as defined above, and the group represented by a  $R_2$  in the general formula (II) is a group represented by a formula of  $OR_{11}$ , wherein  $R_{11}$  is as defined above.

13. The production process according to claim 10 and claim 11, wherein the compound represented by the general formula (II) is 3-hydroxy-2-[2-((2-isopropoxy-6-trifluoromethylpyrimidine-4yl)oxymethyl)phenyl]acrylic methyl.

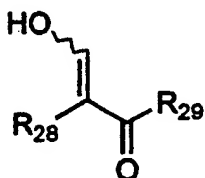
14. A process for producing compounds represented by a general formula (VI-1);



General formula (VI-1)

wherein  $R_{28}$  represents optionally substituted alkyl, optionally substituted hydrocarbon containing an alicyclic structure, optionally substituted phenyl or optionally substituted heterocyclic group,  $R_{29}$  represents  $C_{1-6}$  alkyl,  $C_{3-8}$  cycloalkyl, hydroxy,  $C_{1-6}$  alkoxy, amino, a group represented by a formula of  $NHr_1$ , wherein  $r_1$  represents  $C_{1-6}$  alkyl,  $C_{1-6}$  alkoxy or optionally substituted phenyl, a group represented by a formula of  $Nr_2r_3$ , wherein  $r_2$  and  $r_3$  each independently represents  $C_{1-6}$  alkyl,  $C_{1-6}$  alkoxy or optionally substituted phenyl, optionally substituted hydrocarbon containing an alicyclic structure,

optionally substituted phenyl or optionally substituted heterocyclic group, and R<sub>12</sub> is as defined above, containing a step to O-alkylate a compound represented by a general formula (V);

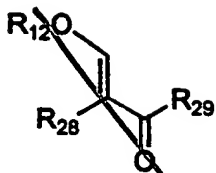


General formula (V)

wherein R<sub>28</sub> and R<sub>29</sub> are as defined above, characterized in that the step to O-alkylate the compound represented by the general formula (V) contains a step to apply an alkylating agent to the compound represented by the general formula (V) in a bilayer mixed-solvent system consisting of an organic solvent and water in the presence of a phase-transfer catalyst and any of an alkali metal hydroxide excluding the lithium salt, an alkali metal carbonate excluding the lithium salt, an alkaline earth metal hydroxide and an alkaline earth metal carbonate while maintaining the concentration of the base in the aqueous solution at 10 wt% or lower.

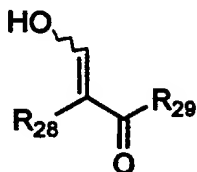
15. A process for producing compounds represented by a general formula (VI-1);





General formula (VI-1)

wherein  $R_{28}$ ,  $R_{29}$  and  $R_{12}$  are as defined above, containing a step to O-alkylate a compound represented by a general formula (V);



General formula (V)

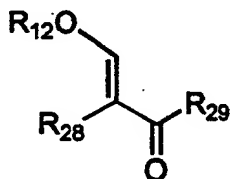
wherein  $R_{28}$  and  $R_{29}$  are as defined above, characterized in that the step to O-alkylate the compound represented by the general formula (V) contains a step to simultaneously feed dropwise an aqueous solution of any of an alkali metal hydroxide excluding the lithium salt, an alkali metal carbonate excluding the lithium salt, an alkaline earth metal hydroxide and an alkaline earth metal carbonate, and an organic solvent solution of the compound represented by the general formula (V) into a bilayer mixed-solvent system consisting of an organic solvent containing an alkylating agent and a phase-transfer catalyst.

16. The process for producing compounds represented by the general formula (VI-1) according to claim 15, wherein the step to O-alkylate the compound represented by the general formula (V) is

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cont  
to O-alkylate a compound represented by the general formula (V) while maintaining the concentration of the base in the aqueous layer at 10 wt% or lower.

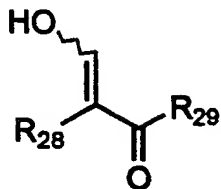
17. The process for producing compounds represented by the general formula (VI-1) according to claim 14 and claim 15, characterized in that the step to O-alkylate a compound represented by the general formula (V) is to O-alkylate a compound represented by the general formula (V) while maintaining the concentration of the base in the aqueous layer at 6 wt% or lower.

18. A process for producing compounds represented by a general formula (VI-1);



General formula (VI-1)

wherein R<sub>28</sub>, R<sub>29</sub> and R<sub>12</sub> are as defined above, containing a step to O-alkylate a compound represented by a general formula (V);



General formula (V)

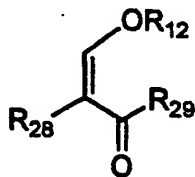
wherein R<sub>28</sub> and R<sub>29</sub> are as defined above, characterized in that the step to O-alkylate a compound represented by the general

formula (V) contains a step to feed dropwise a solution of either the alkali metal salt or the alkaline earth metal salt excluding the lithium salt of the compound represented by the general formula (V) into a bilayer mixed-solvent system consisting of an organic solvent solution, which contains an alkylating agent and a phase-transfer catalyst, and water.

19. The process for producing compounds represented by the general formula (VI-1) according to claim 18, characterized in that the step to O-alkylate a compound represented by the general formula (V) is a step to O-alkylate a compound represented by the general formula (V) while maintaining the concentration of the alkali metal salt or the alkaline earth metal salt excluding the lithium salt of the compound represented by the general formula (V) at 10 wt% or lower.

20. The process for producing compounds represented by the general formula (VI-1) according to any of claim 14 and claim 15, characterized in that either sodium hydroxide or potassium hydroxide is used as the alkali metal hydroxide.

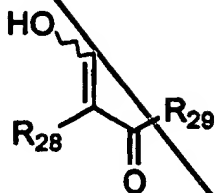
21. A process for producing compounds represented by a general formula (VI-2);



General formula (VI-2)

wherein  $R_{28}$ ,  $R_{29}$  and  $R_{12}$  are as defined above, containing a step to O-alkylate a compound represented by a general formula

(V)



General formula (V)

wherein R<sub>28</sub> and R<sub>29</sub> are as defined above, characterized in that the step to O-alkylate a compound represented by the general formula (V) contains a step to apply an alkylating agent to the compound represented by the general formula (V) in a bilayer mixed-solvent system consisting of an organic solvent and water in the presence of a phase-transfer catalyst and either lithium hydroxide or lithium carbonate.

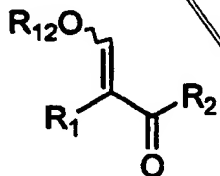
22. The process for producing compounds represented by the general formula (VI-2) according to claim 21, characterized in that the step to O-alkylate a compound represented by the general formula (V) is a step to O-alkylate the compound represented by the general formula (V) while maintaining the concentration of either the lithium hydroxide or the lithium carbonate in the aqueous layer at 5 wt% or higher.

23. The process for producing compounds represented by the general formula (VI-1) according to any of claims 14, 15, 17 and 21, wherein a quaternary ammonium salt is used as the phase-transfer catalyst.

24. The process for producing compounds represented by the general formula (VI-1) according to any of claims 14, 15, 17 and 21, wherein a quaternary ammonium hydroxide is used as the phase-

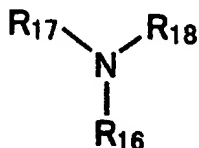
transfer catalyst.

25. A process for producing compounds represented by a general formula (XII);



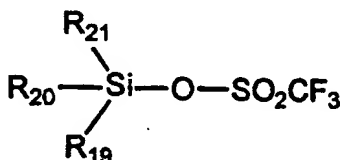
General formula (XII)

wherein  $\text{R}_1$ ,  $\text{R}_2$  and  $\text{R}_{12}$  are as defined above, characterized in that the compound represented by a general formula (XII) is produced by reacting a tertiary amine compound represented by a general formula (VIII);



General formula (VIII)

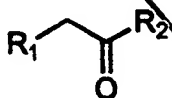
wherein  $\text{R}_{16}$ ,  $\text{R}_{17}$  and  $\text{R}_{18}$  may be same or different and represents alkyl, aryl or aralkyl, and an organic silica compound represented by a general formula (IX);



General formula (IX)

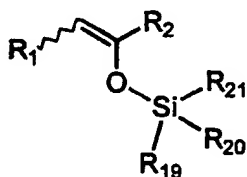
wherein  $\text{R}_{19}$ ,  $\text{R}_{20}$  and  $\text{R}_{21}$  may be same or different and

represents alkyl, aryl or aralkyl with a compound represented by a general formula (VII);



General formula (VII)

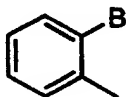
wherein  $R_1$  and  $R_2$  are as defined above, and then reacting an orthoformic acid ester compound represented by a general formula of  $(XI)CH(OCR_{12})_3$ , wherein  $R_{12}$  is as defined above, with a silylenol ether represented by a general formula (X);



General formula (X)

wherein  $R_1$ ,  $R_2$ ,  $R_{19}$ ,  $R_{20}$  and  $R_{21}$  are as defined above, in the presence of a Lewis acid.

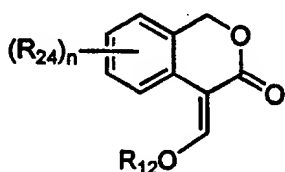
26. The production process according to claim 25, wherein the group represented by  $R_1$  in the compound represented by the general formula (VII) is a group represented by the following formula;



wherein B represents hydrogen, lower alkyl, lower alkoxy, haloalkyl, optionally substituted arylsulfonyloxyalkyl or

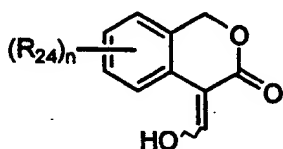
optionally substituted lower alkylsulfonyloxyalkyl, and the group represented by  $R_2$  is a group represented by a formula of  $OR_{23}$ , wherein  $R_{23}$  represents lower alkyl, and B and  $R_{23}$  are a group which may bond to jointly form a ring.

27. A process for producing  $\alpha$ -alkoxymethylenecarbonyl compounds represented by a general formula (XV);



General formula (XV)

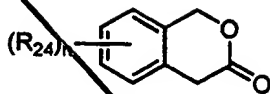
wherein  $R_{24}$  represents nitro, cyano, halogeno,  $C_{1-6}$  alkyl,  $C_{1-6}$  alkoxy,  $C_{1-6}$  haloalkyl, or  $C_{1-6}$  alkoxy carbonyl,  $R_{12}$  is as defined above and  $n$  represents 0 or an integer of 1 to 4, and each of  $R_{24}$  may be same or different when  $n$  is 2 or more integer, containing a step obtain an  $\alpha$ -hydroxymethylenecarbonyl compound represented by a general formula (XIV);



General formula (XIV)

wherein  $R_{24}$  and  $n$  are as defined above, by formylating an isochromanone compound represented by a general formula (XIII);

B<sup>1</sup><sub>ent</sub>

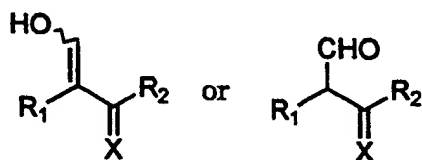


General formula (XIII)

wherein  $R_{24}$  and  $n$  are as defined above, and a step to O-alkylate a compound represented by the general formula (XIV) in a bilayer mixed-solvent system consisting of an organic solvent and water in the presence of a phase-transfer catalyst and a base, without isolating the compound represented by the general formula (XIV).

28. The process for producing compounds represented by the general formula (XV) according to claim 27, characterized in that the step to formylate the isochromanone compound represented by the general formula (XIII) is a step to formylate the compound represented by the general formula (XIII) by using an formic acid ester.

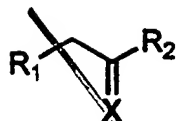
29. An after-treatment process in a step to produce compounds represented by a general formula (II);



General formula (II)

wherein  $R_1$ ,  $R_2$  and  $X$  are as defined above, by reacting a methylene compound represented by a general formula (I);





General formula (I)

wherein  $R_1$ ,  $R_2$  and  $X$  are as defined above, with either an formic acid ester or an orthoformic acid ester in the presence of a Lewis acid and a base, characterized in that the after-treatment process contains a step to add water following to an addition of  $C_{1-4}$  organic acid into the reacted solution to improve the separating property of the solution.

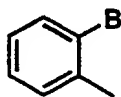
30. The after-treatment process according to claim 29 characterized by using the  $C_{1-4}$  organic acid in an amount of 2.5 times mole or more of the the Lewis acid to be used.

31. The after-treatment process according to claim 29, wherein the  $C_{1-4}$  organic acid is acetic acid.

32. The after-treatment process according to claim 29, wherein the Lewis acid is titanium tetrachloride.

33. The after-treatment process according to claim 29, wherein the base is triethylamine.

34. The after-treatment process according to claim 29, wherein the group represented by  $R_1$  in the compound represented by the general formula (I) is a group represented by the following formula;



wherein  $B$  is as defined above, and the group represented by  $R_2$

is a group represented by a formula of  $OR_{23}$ , wherein  $R_{23}$  is as defined above, and each of B and  $R_{23}$  are a group which may bond to jointly form a ring.

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